TABLE NO | | | |

MULTIMEDIA UNIVERSITY

STUDENT ID NO | | | | | | | | | | |

VENUE _____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

MASTER OF IT (MULTIMEDIA COMPUTING)
TRIMESTER 1, 2015/2016

TSW7011 – PRINCIPLES OF COMPUTING AND PROGAMMING

(All sections / Groups)

21 SEP 2015
8 pm – 10 pm
(2 Hours)

Question	Mark
1	
2	
3	
4	
Total	

INSTRUCTIONS TO STUDENT

1. This question paper consists of 9 printed pages (including the cover page) with four questions. Answer all questions.
2. Attempt all questions. Each question carries 10 marks.
3. Print all your answers **CLEARLY** in the specific answer box provided for each question. Submit this question paper at the end of the examination.

QUESTION 1 [10 marks]

1(a) Draw a diagram of an abstracted view of a computer system. Label the five major hardware components of a computer system in the diagram. **[4]**

1(b) Write a program that prompts the user to input three numbers. The program then displays the numbers in ascending order.

Sample output

```
Enter the three numbers: 3.5 2.1 4

The numbers in ascending order are: 2.1 3.5 4.0
```

[6]

```
import java.util.*;

public class SortThree
{
  public static void main(String[] args)
  {
    Scanner console = new Scanner(System.in);

    double num1, num2, num3;
    double temp;

    System.out.print("Enter the three numbers: ");

    num1 = console.nextDouble();
    num2 = console.nextDouble();
    num3 = console.nextDouble();
    System.out.println();
```

```
    // Write your code from here









  }
}
```

QUESTION 2 [10 marks]

2(a) Write a program that simulates flipping a coin 200 times and reports the longest consecutive sequence of heads. Use (int) (Math.random() + 0.5) to generate a random integer: 0 for heads and 1 for tails. **[6]**

Sample output 1

```
1 0 0 0 0 0 1 1 0 1 1 1 0 0 0 1 0 0 0 1 0 1 1 1 0 0 1 0 1 0 1 1 0 1 0
0 0 0 0 0 0 1 0 1 1 1 0 1 0 0 0 0 0 0 1 1 1 0 0 1 0 0 0 1 1 0 1 1 0 1
1 1 1 1 1 1 1 0 1 1 0 0 1 0 1 0 0 0 1 0 1 0 1 1 1 0 0 1 0 0 1 1 0 1 0
0 0 1 1 0 1 1 0 0 1 0 1 1 0 0 1 1 0 0 0 0 0 0 1 1 1 0 1 0 1 0 0 1 0 0
1 1 1 0 1 1 0 1 0 0 0 0 1 0 1 0 0 0 1 1 1 1 0 1 1 0 1 1 0 1 0 0 0 0 1
1 1 1 1 1 1 0 0 1 0 1 1 0 0 1 0 1 1 0 0 0 1 0 1 0
The longest sequence of 0 is 7
```

Sample output 2

```
1 0 1 0 1 0 0 0 1 0 0 0 0 1 0 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 1 1 1 1
1 0 0 0 1 0 0 0 0 1 0 1 1 1 0 0 0 0 1 0 1 1 0 1 1 0 1 1 1 1 1 1 0 0 1 0
1 0 1 0 1 1 1 1 1 1 0 0 0 1 1 0 0 0 0 0 1 1 0 1 0 0 0 0 0 0 0 0 1 0 1 1 1 1
0 0 0 0 0 1 1 1 0 0 1 1 1 0 1 1 0 1 1 1 1 1 0 1 0 0 0 0 0 0 0 1 0 1 0 1 0
1 1 1 0 0 0 0 1 1 1 0 1 0 1 0 1 0 0 0 1 1 1 1 1 1 1 0 1 0 1 0 1 0 0 1 1
1 0 1 0 0 0 1 0 0 0 0 0 1 1 0 1 1 1 1 1 1 0 0 0 1 0 1
The longest sequence of 0 is 10
```

```
public class FindSequence
{
  public static void main(String[] args)
  {
    // Write your code from here









  }
}
```

2(b) The greatest common divisor of two numbers a and b is the largest number that evenly divides both a and b. For example, the greatest common divisor of 36 and 30 is 6. Write a program to compute the greatest common divisor of two integers a and b. Initialize a as 72 and b as 26 in your program.

Hint: Assume that a > b. Start with b and try every integer less than or equal to b until you find a common divisor: **[4]**

Sample output

```
The greatest common divisor is 2
```

```
public class GCD
{
  public static void main(String[] args)
  {
    int a, b;
    a = 72;
    b = 26;

    // Write your code from here
```

```
  }
}
```

QUESTION 3 [10 marks]

3(a) Explain the scope of modifier `public`, `private` and `protected` in class declaration. **[3]**

3(b) Does a Java program always need to explicitly import java.lang package? Why? **[1]**

3(c) Complete the following program to produce the output as shown below. **[6]**

Output

```
Square 1
****
****
****
****
Square 2
$***
*$**
**$*
***$
```

```
public class DrawSquare
{
  private char[][] a = new char[4][4];

  public DrawSquare() {
    setSquare1();  // This function set the contents of a[][]
    drawSquare(1); // This function only prints the contents of a[][]
    setSquare2();  // This function set the contents of a[][]
    drawSquare(2); // This function only prints the contents of a[][]
  }

  public static void main( String args[] )
  {
      DrawSquare d = new DrawSquare();
  }



  public void setSquare1()
  {
    //Write your code from here









  }

  public void setSquare2()
  {
    //Write your code from here









  }

  public void drawSquare(int b)
  {
    //Write your code from here

    System.out.println( "Square " + b );
    for( int i=____; _____;  _____)        // Fill in the blanks
    {
```

```
      for( int j= ____; _____;  _____)
      {
        System.out.print(a[i][j]);
      }
      System.out.println();
    }
  }
}
```

QUESTION 4 [10 marks]

4(a) What is the difference between a constructor and a method? **[2]**

Refer to Figure 1 for Q4(b) and Q4(c).

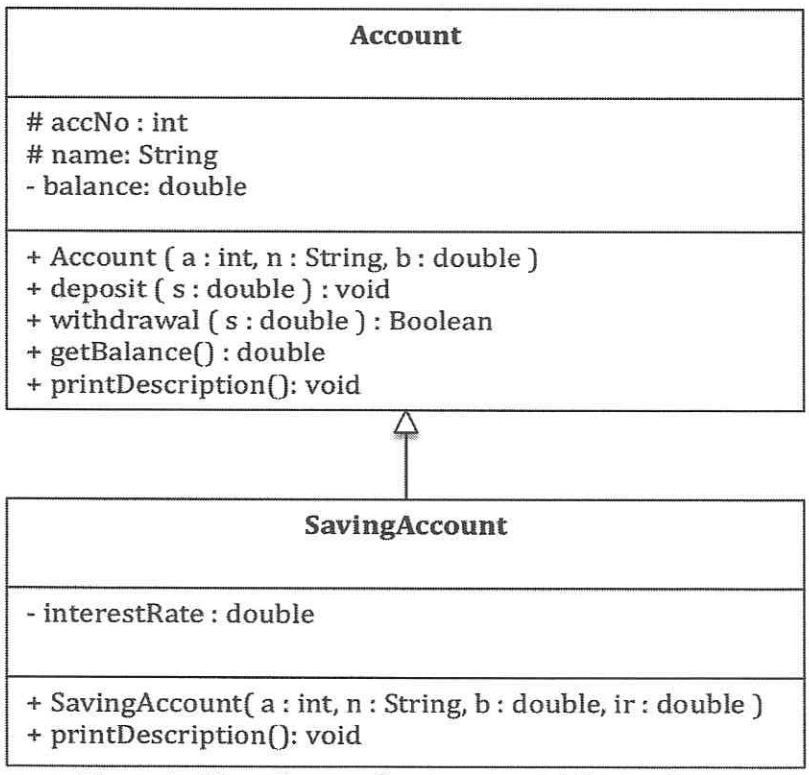

Figure 1: Class diagram for *Account* and *SavingAccount*

4(a) Complete the program for the class *Account* below.
Note:

- The *deposit* function is to add the given amount, *s* to the *balance*.
- The *withdrawal* function is to deduct the given amount, *s* from the *balance*. It can be performed successfully when there is enough *balance* in the account. It returns true if the withdrawal is successful or false if it is not.
- The *balance* of an account must never be negative.

[4]

```
public class Account {
  protected int accNo;
  protected String name;
  private double balance;

  public Account(int a, String n, double b)
  {
    accNo = a;
    name = n;
    balance = b;
  }

  //Write your code from here









  public void printDescription()
  {
    System.out.println("Account number = " + accNo );
    System.out.println("Name = " + name );
```

```
    System.out.println("Balance = " + balance );
  }
}
```

4(b) Given the TestAccount class below, write a Java program for the class *SavingAccount* to generate the output shown.

[4]

```
public class TestAccount
{
  public static void main( String[] a )
  {
    Account a1 = new Account(1001, "James Martin", 1234.56);
    SavingAccount a2 = new SavingAccount(1002, "Siti N", 57.98, 2.5);
    a1.printDescription();
    a1 = a2;
    a1.printDescription();
  }
}
```

Output

```
Account number = 1001
Name = James Martin
Balance = 1234.56
Account number = 1002
Name = Siti N
Balance = 57.98
Interest rate = 2.5
```